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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/773,731
Filing Date: February 05, 2004
Appellant(s): BAUMAN, NATAN

H.M. Bedingfield, Reg. No. 44,530
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 13 September 2007 appealing from the Office action mailed 25 June 2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The following are the related appeals, interferences, and judicial proceedings known to the examiner which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal:

Appeal in U.S. Patent Application 10/325,529.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5,987,146	PLUVINAGE et al.	11-1999
5,960,093	MILLER	9-1999
6,804,368	TSUDA	10-2004
4,425,481	MANSGOLD et al.	1-1984
2004/0010181	FEELEY et al.	1-2004 (filed10-2001)
2003/0002700	FRETZ et al.	1-2003 (filed 7-1997)

- Knowles Electronics Product Catalog - Standard Receivers [online], [retrieved on 2006-12-05] Retrieved from the Knowles Electronics website <URL:http://www.knowleselectronics.com/products/technology.asp?CATEGORY_ID=2&TECHNOLOGY_ID=5>.
- Shepherd, N. L., Heading to the Beginning, Hearing Products Report July 2006 [online], [retrieved on 200612-05] Retrieved from Hearing Products Report website <URL:http://www.hearingproductsreport.com/article.php?s=HPR/2006/07&p=3>.
- GN Magazine January 2005 [online], [retrieved on 2006-12-07] Retrieved from GN website <URL:http://www.gn.com/var/gn/storage/original/application/ea22f38e4dbfc9fcb0e3cc77e0d7088d.pdf>.

- ReSoundAiR presentation notes/pamphlet (in Danish) 8 September 2003 [online], [retrieved on 2006-12-06], Retrieved from GN website <URL:http://www.gn.com/var/gn/storage/original/application/phpG5vgnN.pdf>.
- Hearing Aid Sales Up a Little in '99, The Hearing Journal March 2000 [online], [retrieved on 2006-12-06], Retrieved from Find Articles website <URL:http://www.findarticles.com/p/articles/mi_hb3496/is_200003/ai_n8289085>.
- Kirkwood, David H., Hearing aid sales slip back to norm, but leaders see growth potential, The Hearing Journal December 2005 [online], [retrieved on 2006-1206], Retrieved from The Hearing Journal website <URL:http://www.audiologyonline.com/theHearingJournal/pdfs/HJ2005_12_pg11-20.pdf.>

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the appellant regards as his invention.

1. **Claims 10-12 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement.**

Claims 10-12 contain subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. These claims each recite that the maximum lateral dimension of the receiver is less than twenty percent of the maximum lateral dimension of the user's ear canal. Besides the fact that this is indefinite since the basis of comparison, i.e. a maximum lateral dimension of a user's ear canal, is variable since everyone has a different maximum lateral canal dimension, making an assumption of 10mm as the average largest size, means the receiver must be 2mm or less at its maximum lateral point. Considering the appellant's specification neither suggests where to purchase such a receiver or how to make such a receiver, it is up to the skill of an ordinary practitioner and the knowledge in the prior art to make such a receiver.

Unfortunately, the prior art illustrates that the smallest audio receiver obtainable at the time of the invention was larger than 2mm. For example, Knowles Electronics, which is a leader in hearing aid receiver design, produces the world's smallest armature receiver as the FK series receiver, with a maximum dimension of 2.73mm. See Knowles product catalog description for FK receiver. The size of the FK series receiver was decreased by 0.005 inches in the manner shown in US Patent 5,960,093. This minor improvement shows that those of ordinary skill in the art struggle to even find tiny ways to shrink their receivers. In addition, US Patent 6,804,368 to Tsuda of Ferrotec Corporation discloses micro-speakers with a diameter of 7.9mm. See column 4, lines 15-29. Moreover, Tsuda discloses the inherent difficulty in manufacturing micro-speakers, such as low yields, which illustrates that decreasing size causes unpredictable results and is not necessarily within the ability of one of ordinary skill in the art. See column 2, lines

38-50. In this way, it is apparent that creating a receiver dimensioned as claimed would require either innovative processes or the development of novel speaker technologies.

Evidence that unreasonable experimentation would be required is that since 1999, the lateral dimensions of the FK series receiver have remained the same, suggesting that no ordinary "tweaks" are being discovered. Second, technologies such as MEMS, which might be capable of meeting the claimed dimensions, have not even been fully developed as of July 2006, which is years away from the filing date of this application. Shepherd, N. L., Heading to the Beginning, Hearing Products Report July 2006 (retrieved on 05 December 2006) (http://www.hearingproductsreport.com/article.php?s=HPR/2006/07&p=3). Therefore, as the appellant provides no direction and no working examples for the claimed invention and as the prior art does not provide the required solution, evidence that it would have been in ability of one of ordinary skill in the art, that shrinking is a predictable exercise, or a suggestion that only minor experimentation would have been needed the above noted claims are rejected for failing to comply with the enablement requirement.

2. **Claims 1-12, 19, 21-24, 26-29, 35, 40 and 42-55, 58-60, 62, 64 and 66 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which appellant regards as the invention.**

Claims 1-12, 19, 21-24, 26-29, 35, 40 and 42-55, 58-60, 62, 64 and 66 all recite that the hearing aid claimed therein comprises a receiver generating about three decibels or below of insertion loss over a portion of the human ear audible frequencies. This limitation is indefinite

since (1) the test used for measuring insertion loss cannot be repeated and because (2) the remainder of appellant's specification fails to set forth other means for determining the size of the receiver. Generating 3dB of insertion loss is a functional limitation that limits the claimed hearing aid by requiring that a hearing aid receiver by capable of generating 3dB of insertion loss. Since insertion loss in ear canals is primarily determined by the size of an ear insert relative to the size of the ear canal, this claim limitation effectively requires the claimed hearing aid to include a receiver *sized* to generate 3dB of insertion loss. However, because the ear itself may non-linearly amplify/attenuate sounds, by way of otoacoustic emissions, and the levels of sounds used for measuring insertion loss are not disclosed the specification fails to set forth means for repeating the insertion loss measurements performed in evaluating appellant's invention. Moreover, because the amount of insertion loss depends on the size of the ear canal used to measure insertion loss and because the size of the ear canal used in testing is not disclosed, the specification further fails to set forth means required for repeating appellant's insertion loss measurements. Because the insertion loss measurements cannot be repeated, the limitation of generating 3dB of insertion loss fails to define the size of the claimed hearing aid receiver.

The remainder of appellant's specification does not definitely set forth the size of the claimed hearing aid receiver. For instance, appellant attempts to obliquely define the size of the receiver in terms of its maximum lateral dimension with regard to a maximum lateral dimension of a user's ear canal. For example **claims 8-12, 36-38, 56, 57, 61, 63, 65 and 67** all recite that a maximum lateral dimension of the receiver is less than a certain percent of the maximum lateral dimension of a user's ear canal. This limitation is a relative measure as it compares the lateral dimension of a first element to the lateral dimension of a second element. Because the

dimension of the second element is variable and because the first element is quantitatively sized relative to the second element, it follows that the lateral dimension of the first element is indefinite. See MPEP 2173.05(b) and Ex parte Brummer, 12 USPQ2d 1653, where a claim was made to a bicycle (hearing aid) that recited "said front and rear wheels so spaced as to give a wheelbase (maximum lateral dimension of a receiver) that is between 58 percent and 75 percent of the height (maximum lateral dimension of a user's ear canal) of the rider (user) that the bicycle was designed for." For purposes of this Office Action, a value of 10mm will be used as an average maximum lateral dimension of a user's ear canal. Based on the assumption of an average maximum lateral dimension of 10mm and the disclosure that the claimed receiver is less than about 50% of a user's maximum lateral dimension, the maximum lateral size of the receiver required to generate 3dB of insertion loss is 5mm. Specification at p. 2 ¶ 10.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. **Claims 1-7, 40, 42-53 and 59-63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pluvinage et al. (US Patent 5,987,146).**

Claim 1 is limited to "a hearing aid." Likewise Pluvinage teaches a hearing aid in particular, an open ear canal hearing aid system with the speaker in the ear canal as disclosed in the Abstract. The embodiment of most importance herein is depicted in figure 7. Therein, the

hearing aid is shown to comprise a "speaker" 44. The speaker is held in place by one of the ear tips shown in figures 3a, 3c, 4a and 4c. Figures 4a and 4c illustrate ear tips including flanges 21 for suspending the tube 30 within the ear canal as well as the speaker 44 mounted at the end of the tube. See column 5, lines 31-55. As seen in figure 7, sound received at microphone 42 is processed in accordance with hearing loss programming within processor 48 and passed via an electrical connection within tube 30 to speaker 44. As seen in figure 5a, tube 30 passes over the external ear and through the ear canal opening. Since the signals output by the processor are electrical tube 30 must comprise an electrical connection to electroacoustic transducer 44. Moreover, processor 48 corresponds to an amplifier 48 and is clearly positioned within the behind the ear unit.

Concerning the claim that the receiver generates three decibels or below of insertion loss over a portion of the human ear audible frequencies, this limitation attempts to define the structure of a hearing aid receiver based on its function. Because the limitation is indefinite, the size must be assumed to be no more than 5mm. The Knowles receiver used by Pluvinage has the same size as the receiver disclosed by appellant and will inherently generate the same insertion loss since insertion loss is primarily a function of receiver size.

Although Pluvinage discloses a device significantly similar to what is claimed, it cannot be shown that Pluvinage anticipates the claimed invention. Specifically, Pluvinage fails to place the microphone sampling position outside of the ear canal. However, this deficiency is overcome by an obvious modification.

Concerning the microphone sampling position, Pluvinage remarks that sampling behind the ear can degrade sound quality. See column 2, lines 51-56. Despite this alleged evidence of

teaching away, it is noted that merely eliminating an element and its function is obvious if the function of the element is not desired. *Ex parte Wu*, 10 USPQ 2031; *In re Larson*, 144 USPQ 347; *In re Kuhle*, 188 USPQ 7. In this way, removing the tube 32 connecting microphone 42 to the ear canal and thus eliminating the function of sampling within the ear canal would have been obvious provided the sampling function was not desired. It is reasonable that because the Pluvinage patent provides protection for a hearing aid with said sampling position, eliminating said canal sampling position and reverting to the known external sampling position would have been desirable for avoiding direct copying and potential infringement of Pluvinage's patent. Furthermore, the tube 32 clearly presents an acoustic mass that modifies any sound input to the tube. So while the tube allows use of the user's outer ear frequency response, the tube also creates acoustic noise. This analysis illustrates that Pluvinage's disclosure solves some problems, but creates other problems. Instead of teaching away, Pluvinage simply defines an area for design choice/tradeoff.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to remove the sound tube 32 of Pluvinage since mere elimination of an element and its function is obvious provided that the function is undesired, which it certainly is in this case. Although some problems are solved, the solution creates extra problems that are not necessarily less burdensome or troubling. Furthermore, eliminating the tube 32 allows a practitioner the ability to take advantage of open ear receiver hearing aids without licensing Pluvinage's invention.

Claims 2-6 and 42-53 are limited to "the hearing aid according to claim 1," as covered by Pluvinage. Each of these claims recites a particular insertion loss over a particular frequency

range. It is respectfully submitted that based on the assumptions apropos the rejection of claim 1, the Knowles receiver used by Pluvinage will inherently generate the same insertion losses claimed. Therefore, Pluvinage makes obvious all limitations of the claims.

Claim 7 is limited to "the hearing aid according to claim 1," as covered by Pluvinage. The claim recites that the receiver is in either the bony region, the cartilaginous region or both. These three positions are all the possible locations for a receiver in the ear canal, so Pluvinage must disclose this. Therefore, Pluvinage makes obvious all limitations of the claim.

Claim 40 is limited to "the hearing aid according to claim 1," as covered by Pluvinage. As seen in figure 1, a stiffening member 14 is provided in addition to an intermediate connection portion 10 and an electrical conducting component that is not shown but is inherent based on the disclosure that a speaker is placed in the ear canal. Therefore, Pluvinage makes obvious all limitations of the claim.

Claim 59 is limited to "the hearing aid according to claim 40," as covered by Pluvinage. Pluvinage illustrates element 14 as a wire. Therefore, Pluvinage makes obvious all limitations of the claim.

Claim 60 is limited to "the hearing aid according to claim 1," as covered by Pluvinage. As seen in figure 10, the hearing aid of Pluvinage is envisioned to include programmable circuitry, under control of control circuitry 80. The circuitry and program memory is encased in the BTE unit 40. See column 6, lines 46-67. Therefore, Pluvinage makes obvious all limitations of the claim.

Claim 62 is limited to "the hearing aid according to claim 1," as covered by Pluvinage. Column 7, lines 6-16, describes that the control circuit controls the compressors, rendering the

compressors "reprogrammable." Therefore, Pluvinage makes obvious all limitations of the claim.

Claims 61 and 63 recite essentially the same limitations as claims 60 and 62, and are rejected for the same reasons.

4. **Claims 8, 26-29, 35-37 and 54-57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pluvinage in view of the Knowles Electronics Product Catalog - Standard Receivers, http://www.knowleselectronics.com/products/technology.asp?CATEGORY_ID=2& TECHNOLOGY_ID=5 (retrieved on 05 December 2006) (herein Knowles product catalog).**

Claim 8 is limited to "the hearing aid according to claim 1," as covered by Pluvinage. Pluvinage discloses that his receiver is an EH series receiver by Knowles Electronics. This receiver is known to have a maximum lateral dimension of 3.55mm. See Knowles Product Catalog description of the EH series receiver. Assuming that an average human's ear canal has a maximum lateral opening of 10mm at the entrance to the canal, it is seen that the disclosed EH series receiver is "less than half a maximum lateral dimension of a user's ear canal." Therefore, Pluvinage makes obvious all limitations of the claim.

Claim 26 is limited to "the hearing aid according to claim 1," as covered by Pluvinage. Speaker 44 of Pluvinage is actually a Knowles electronic receiver. These receivers include an internal speaker as well as a metallic casing as claimed. As specified by Pluvinage an EH series receiver is used, which inherently includes first and second end portions as seen in the Knowles

online product catalog. The two terminals of the receiver are located on a first end different than the second end, and must communicate with the intermediate connection portion 30 connecting the speaker to the electrical output of sound processor 48. On the other end is a port clearly seen in the product catalog's EH series receiver image. Therefore, Pluvinage makes obvious all limitations of the claim.

Claim 27 is limited to "the hearing aid according to claim 26," as covered by Pluvinage. As seen in figure 4b of Pluvinage, an ear tip 12 is provided in communication with the speaker's 44 port. This tip includes a membrane 18b that protects the port from debris. See column 5, lines 31-55. Therefore, Pluvinage makes obvious all limitations of the claim.

Claim 28 is limited to "the hearing aid according to claim 27," as covered by Pluvinage. The solid construction of the EH series receiver seen in the product catalog clearly seals the casing to debris at the first end portion and along a length of the casing extending to the port. Therefore, Pluvinage makes obvious all limitations of the claim.

Claim 29 is limited to "the hearing aid according to claim 26," as covered by Pluvinage. As seen in figure 4b of Pluvinage, an ear tip 12 is provided in communication with the speaker's 44 port. This tip includes a membrane 18b that protects the port from debris, including cerumen. The tip is also removable. See column 5, lines 31-55. Therefore, Pluvinage makes obvious all limitations of the claim.

Claim 35 is limited to "the hearing aid according to claim 1," as covered by Pluvinage. The Knowles EH series receiver includes at least two ports, so that at least two electrical conducting components must be routed through intermediate connecting portion 30 to the speaker. See Knowles Product Catalog description of EH series receiver. Since electrical

conductors cannot bridge each other, it is inherent that they must be isolated for proper operation. Therefore, Pluvinage makes obvious all limitations of the claim.

Claim 54 is limited to "the hearing aid according to claim 1," as covered by Pluvinage. This claim seeks to limit the structure of the claimed hearing aid based on how it is employed. In this way, it is only necessary that the hearing aid be dimensioned such that the receiver could conceivably be positioned within the cartilaginous outer region of the ear canal of the user. This is clearly possible with the hearing aid of Pluvinage since the receiver is only 3.55mm in maximum lateral dimension versus, where the maximum lateral entrance to an ear canal is about 10mm. Therefore, Pluvinage makes obvious all limitations of the claim.

Claim 55 is limited to "the hearing aid according to claim 1," as covered by Pluvinage. As seen in figure 5b, the tube 10 is suspended within the ear canal and away from the walls, such that a receiver mounted within the tubing would also be so suspended. Figures 4a-4d provide optional tips for supporting a receiver in a canal. Therefore, Pluvinage makes obvious all limitations of the claim.

Claims 56 and 57 recite essentially the same limitations as claims 54 and 55, and are rejected for the same reasons.

Claims 36 and 37 recite essentially the same limitations as claim 8, and are rejected for the same reasons.

5. **Claims 9 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pluvinage in view of the Knowles product catalog and Miller (US Patent 5,960,093).**

Claim 9 is limited to "the hearing aid according to claim 8," as covered by Pluvinage. The EH series receiver disclosed by Pluvinage has a maximum lateral dimension of 3.55mm, which is greater than thirty percent of an average human's maximum lateral ear canal dimension of 10mm. However, this deficiency is overcome by an obvious modification. In particular, Pluvinage does not require the use of the EH series receiver, but merely uses it in one embodiment. Since 1997, Knowles electronics has released a plurality of smaller receivers, such as the FK series receiver, a description of which is provided in Miller (US Patent 5,960,093). This receiver has a maximum lateral dimension of 2.73mm, which is "less than thirty percent of a maximum lateral dimension of a user's ear canal." As the receivers are functionally equivalent, are both manufactured by the same company, and are both designed for use in hearing aids, it is obvious to replace one with the other.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to replace a known receiver by Knowles with another functionally equivalent receiver used in the field of hearing aids and that is advantageously smaller so that it leaves the ear canal more open, which conforms to the design goals of Pluvinage.

Claim 38 recites essentially the same limitations as claim 9 and, and is rejected for the same reasons.

6. **Claims 64-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pluvinage in view of Mansgold et al. (US Patent 4,425,481).**

Claims 64 and 66 are limited to "the hearing aid according to claim 1," as covered by Pluvinage. These claims refer to user selection of multiple hearing aid programs stored in the

BTE. Pluvinage fails to disclose this feature; however, this deficiency is overcome by an obvious modification.

In particular, it is well established that providing multiple sound programs within a single hearing aid allows a user to choose between programs optimized for various listening situations. Such a concept is illustrated by Mansgold, who discloses a programmable signal processing device. See column 1, line 11, through column 2, line 22.

It would have been obvious to provide multiple programs in a memory within the BTE unit of Pluvinage for the purpose of allowing a user to select between optimal settings for a specific listening environment without having to change hearing aids.

Claims 65 and 67 recite essentially the same limitations as claims 64 and 66, and are rejected for the same reasons.

7. **Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Feeley et al. (US Patent Application Publication 2004/0010181) in view of Fretz et al. (US Patent Application Publication 2003/0002700) and Pluvinage.**

Claim 1 is limited to "a hearing aid." Similarly, Feeley discloses a hearing aid as seen in figure 1. The hearing aid of Feeley includes a BTE unit 33 comprising a microphone 62 that samples outside of the canal, and a receiver 13 suspended within an ear canal of a user by way of mold 11. As seen in figure 6A, input from microphone 62 is sent to processing circuitry 61, which outputs to connector 60 and then to receiver 13 by way of connectors 20 and 31. Circuitry 61 processes microphone signals according to hearing loss programming. See paragraphs [0056] through [0057]. Since BTE unit 33 sits behind the user's cartilage, the output of the amplifier

circuitry 61 is passed electrically around a portion of the user's external ear using wires 22. See paragraphs [0069] and [0072]. As seen in figure 6A, the microphone 62 and amplifier 61 are in the BTE unit 33. While Feeley discloses many elements of the claimed invention, Feeley does not disclose that the receiver is suspended in an open ear configuration since a mold is used, and that the receiver generates about three decibels or below of insertion loss over a portion of the human ear audible frequencies. However, these deficiencies are overcome by an obvious modification.

In particular, the use of ear molds, as used by Feeley, in hearing aids has been recognized in the art as problematic. Namely, Fretz discloses in paragraphs [0007] and [0008] that blocking the canal creates occlusion and reduction in natural sounds and that venting is not sufficient. Moreover, Fretz states that using molds requires either expensive fitting procedures or the use of stock canal ear tips, which are at best uncomfortable. See paragraphs [0010] and [0011]. All these disadvantages of molds led Fretz to design an open ear canal design. See paragraphs [0002] and [0013] as well as figure 1, which illustrates a tube 12 coupled to a BTE unit 10 and a maintaining ear tip 14.

It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the mold 11 of Feeley with an open ear tip as taught by Fretz for the purpose of alleviating all the problems enumerated by Fretz, and which happen to coincide with many of the advantages purported to have been solved by appellant's invention. In fact, the only advantage not taught by Fretz is that of acoustic tube resonance, but since Feeley is the base reference being modified and does not include said resonance noise, this advantage is moot and a solid case of obviousness stands.

Regarding the claimed insertion loss, Feeley fails to specify which receiver to use, except to say that any Knowles receiver is preferred. See paragraph [0038]. The Knowles receiver catalog provides both EH series receivers as used by Pluvinage (US Patent 5,987,146) as well as even smaller FK series receivers. Since Pluvinage used an EH series receiver and achieved insertion gain (which is assumed for the purposes of this Office Action to be what the appellant intended by the term insertion loss) in the range claimed, it is reasonable that merely picking the EH series receiver from the Knowles list would render this remaining claim limitation obvious in view of the prior art.

It would have been obvious to one of ordinary skill in the art to use the EH series receiver made by Knowles electronics in the hearing aid of Feeley since Feeley expressly suggests using any Knowles receiver.

8. **Claims 19, 21-24 and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Feeley in view of Fretz and Pluvinage and further in view of GN Magazine January 2005, http://www.gn.com/var/gn/storage/original/application/ea22f38e4dbfc9fcb0e3cc77e0d7088d.pdf (retrieved on 07 December 2006), the ReSoundAiR presentation notes/pamphlet, 8 September 2003, http://www.gn.com/var/gn/storage/original/application/phpG5vgnN.pdf (retrieved on 06 December 2006) and An Innovative Non-Occluding DSP Device, GN ReSound article created April 2003, http://www.openfitting.com/2903-gb-03.02.pdf (retrieved on 06 December 2006).**

Claim 19 is limited to "the hearing aid according to claim 1," as covered by Feeley in view of Fretz. The hearing aid of Feeley includes an intermediate connection portion 21 containing electrical connections 22. This portion ends at a mold that suspends a receiver 13 in an ear canal of a user. However, in accordance with the rejection of claim 1, the mold is replaced with an open ear tip 14 as seen in figure 1 of Fretz. However, neither Feeley nor Fretz discloses a retaining member as claimed. This deficiency is overcome by an obvious modification.

First, it is noted that figure 1 of Fretz supports the language of Fretz's claim 1. It is also noted that figure 1 and claim 1 are embodied in the commercially available GN ReSoundAiR hearing aid, which was released in May 2003. See GN Magazine 1-05, page 13, column 1, lines 7-8. As seen on page 12 of the ReSoundAiR pamphlet released 8 September 2003, the ReSoundAiR includes a sports lock extending from the intermediate connection portion, labeled as number 12 in figure 1 of Fretz. This sports lock is disclosed as contacting the concha of the user and providing increased retention of the ear tip within the ear canal. See GN ReSound article entitled "An Innovative Non-Occluding DSP Device" generated April 10 2003, figure 1 and page 2, column 2.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to couple a retaining sports lock to the intermediate connection member of Fretz as taught by the ReSoundAiR pamphlet and GN ReSound article for the purpose of increasing retention of the ear tip within the ear canal.

Claim 21 is limited to "the hearing aid according to claim 19," as covered by Feeley in view of Fretz and further in view of the GN Magazine, the ReSoundAiR pamphlet and the GN

ReSound article. The similarity in structure between the sports lock disclosed in the pamphlet and article and the retaining member 54 seen in figure 4 of the application means that the sports lock will provide the same functionality as claimed. Therefore, the cited prior art makes obvious all limitations of the claim.

Claim 22 is limited to "the hearing aid according to claim 19," as covered by Feeley in view of Fretz and further in view of the GN Magazine, the ReSoundAiR pamphlet and the GN ReSound article. Again, the similarity in structure between the sports lock and the claimed retention member 54 as seen in filed figure 4 supports an inherency argument that the sports lock will perform the claimed function. Therefore, the cited prior art makes obvious all limitations of the claim.

Claim 23 is limited to "the hearing aid according to claim 19," as covered by Feeley in view of Fretz and further in view of the GN Magazine, the ReSoundAiR pamphlet and the GN ReSound article. As noted in the rejection of claim 19, the sports lock acts to retain/stabilize. Therefore, the cited prior art makes obvious all limitations of the claim.

Claim 24 is limited to "the hearing aid according to claim 19," as covered by Feeley in view of Fretz and further in view of the GN Magazine, the ReSoundAiR pamphlet and the GN ReSound article. As noted in the rejection of claim 19, the sports lock acts to retain/prevent movement. Therefore, the cited prior art makes obvious all limitations of the claim.

Claim 58 is limited to "the hearing aid according to claim 19," as covered by Feeley in view of Fretz and further in view of the GN Magazine, the ReSoundAiR pamphlet and the GN ReSound article. The ReSoundAiR pamphlet and GN ReSound article clearly illustrate the sports lock as a wire. Therefore, the cited prior art makes obvious all limitations of the claim.

9. **Claims 36-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Feeley in view of Fretz and Pluvinage and further in view of the Knowles product catalog and Miller.**

Claims 36-38 are limited to "a hearing aid." These claims are rejected in view of Feeley and Fretz for the same reasons apropos claim 1 as well as the following. It is noted that the claimed receiver's maximum lateral dimension is less than fifty/forty/thirty percent of the maximum lateral dimension of a user's ear canal. As noted in the rejection of claim 1, it would have been obvious to pick, for example, the Knowles FK series hearing aid receiver since Feeley expressly permits selection of any viable Knowles receiver. The FK series receiver's maximum lateral dimension is 2.8mm, which is less than thirty percent (3mm) of an average maximum lateral dimension of 10mm, and thus satisfies the claimed requirement. The available date of the FK series receiver is established in the Miller patent. Therefore, Feeley in view of Fretz and the Knowles product catalog makes obvious all limitations of the claims.

(10) Response to Argument

To summarize for the Board, appellant's invention is a behind-the-ear hearing aid that places the sound producing receiver 16 within the hearing aid wearer's ear canal. Specification at fig.5. The receiver is sized specifically to minimize the amount of the ear canal that is blocked. *Id.* at 2 ¶¶ 8-10. In keeping the size of the receiver to a minimum, both the occlusion effect and insertion effect created by the receiver are reduced. The occlusion effect manifests itself as the emphasis of low-frequency sound, especially of one's voice while talking. *Id.* at 1 ¶ 4. This is

the same aural effect as occurs when placing hands over one's ears and singing a pitch. The insertion loss effect manifests itself as the reduction in loudness of sounds external to one's ear canal after covering one's ear canal. Appellant's invention, thus, is similar in effect to one removing his hand from covering his ear so he no longer suffers the occlusion effect and the insertion loss effect.

The record clearly established that appellant is not the first to devise a so-called open ear canal hearing aid. *Pluvinage* and *Fretz*, for example, were among the first inventors to leave the ear canal open. To establish the high-degree of obviousness of the claimed invention, the examiner established two independent paths of rejection. The first path was based on the teachings of *Pluvinage*; the second path was based on the teachings of *Feeley* in view of *Fretz*.

The record admits to differences between *Pluvinage* and the claimed invention, such as the location of microphone sampling. The *Pluvinage* microphone samples within the hearing aid wearer's ear canal, while the claimed invention samples about a behind-the-ear unit. The examiner held the removal of ear canal sampling obvious since removal of the microphone sampling tube both generated acoustic noise and was economically unnecessary—two reasons why the function of sampling would not be desired. Appellant challenges both of these bases by establishing the necessity of the sampling tube and that the economic reason for modification was beyond the knowledge of one of ordinary skill in the art.

Because *Feeley* did not leave the ear canal open and because *Fretz* did not place the receiver within the hearing aid wearer's ear canal, the examiner synthesized *Feeley* and *Fretz* to show obviousness. *Feeley* used a prior art ear mold to substantially occlude the hearing aid wearer's ear canal, but used a receiver in the canal. *Fretz* taught that the use of ear molds, such

as the mold disclosed by *Feeley*, created several drawbacks solvable by replacing the mold with an open ear fitting. Appellant challenges this rejection mainly by asserting that one of ordinary skill in the art would be incapable of applying advantages of *Fretz* to *Feeley* because the two hearing aids differ in their sound delivery mechanisms: *Feeley* has the receiver in the ear canal, *Fretz* routes sound from the behind-the-ear unit to the ear canal via a tube.

Common to both paths of rejection is the indefiniteness of the generating 3dB of insertion loss limitation, which is handled similarly in both paths: a Knowles receiver meets the presumed size of appellant's receiver and, thus, generates the same insertion loss. Appellant tries to refute this ground of rejection by asserting that any Knowles receiver used would require a plastic casing that would likely increase the receiver size beyond the presumed 5mm limit.

Finally, appellant has established an overwhelming body of secondary considerations of non-obviousness. Unfortunately, the secondary considerations are only overwhelming in terms of shear volume and not weight. The appellant's body of evidence includes two expert opinions, gross sales numbers without reference to relevant sales in the market, evidence of advertising budget and pamphlets from competitors lauding their own devices. Each of appellant's arguments, Brief at 6-40, will be addressed in turn using like outlining to facilitate understanding of examiner's position with regard to appellant's arguments.

(A) The examiner fails to give any weight to evidence of secondary considerations.

Appellant alleges that the examiner failed to consider and give weight to appellant's secondary considerations of non-obviousness. Appellant is clearly in err since a review of both the Non-Final Office Action filed 18 December 2006 and the Final Office Action filed 25 June

2007 reveals detailed analyses of appellant's secondary considerations. Appellant contends in proceeding sections of his brief some particular secondary considerations he feels were overlooked, so further comment will be reserved for these specific situations.

(B) The examiner erroneously asserts that expert testimony itself is not valid evidence in support of non-obviousness, but must instead be supplemented by separate evidence.

One particular area where appellant feels the examiner overlooked the weight of appellant's secondary considerations is the allegations of the experts. Appellant sights many allegations he feels the examiner failed to give weight to evidence. For example, the examiner noted that Dr. Glaser, one of the experts, did not explain why *Pluvinage* required a sound sampling tube. Final Rejection at 20 (6 July 2007). Another example, the examiner noted that Dr. Glaser described *Feeley* as an ear occluding design even though *Feeley* disclosed the use of an open mold to avoid occlusion. *Id.* These two examples are characteristic of the examiner's treatment of the experts' claims: either they were conclusory statements or they defied logic and the record. Appellant may be correct that such statements are worthy of weight, but the examiner submits that one cannot reasonably find the appellant's invention non-obvious in view of a collection of tenuous allegations versus two principled prima facie cases of obviousness. The only factor in appellant's favor is the authority of the experts. Although each expert boasts an impressive list of lifetime achievements, the lack of any cogent, principled allegation by both experts tends to reduce any credibility one might lend to their allegations.

(C) The examiner improperly contends that motivation to modify references may be reasoned from alleged desired of "one of ordinary skill in the art" to avoid patent claim infringement.

The appellant alleges that the examiner has stated, as a principle of law, that one can remove any claim element from the prior art. To be precise, examiner's conclusion is best summarized as it being obvious to remove an element and its function from the prior art if the function is not desired, such as to reduce cost of invention by eliminating elements not covered by the scope of the prior art's claims. The basis of the law was founded in *Ex parte Wu*, 10 USPQ 2031; *In re Larson*, 144 USPQ 347; and *In re Kuhle*, 188 USPQ 7 (elimination of an element and its function if the function is not desired is obvious). The examiner simply applied the law to the market place of inventions. Applicant objects to examiner's conclusion on two grounds: (1) the rule allows one to remove any feature of an invention, including necessary features, and (2) one of ordinary skill in the art has to be willing and able to determine claim scope to avoid infringement. The first objection is clearly irrelevant since one would not desire to remove something as fundamental as an engine to avoid patent infringement, and with the absence of desire the rule contended for by the examiner would not apply. The second objection fails because claims are to be drafted for the understanding of one of ordinary skill in the art. Indeed, during prosecution the PTO applies the broadest reasonable interpretation in light of the specification standard for claim construction to ensure that claims, once issued, are not interpreted more broadly than justified. *In re Prater*, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-51 (CCPA 1969). The standard involves interpreting the claims as one of ordinary skill in the art likely would. *In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364, 70 USPQ2d 1827

(Fed. Cir. 2004). As the goal of the standard ensures broad claim interpretation, one of ordinary skill in the art would probably grant wider birth to a claim than a court might ultimately, but it does not follow that one of ordinary skill in the art is totally helpless in ascertaining claim scope. Notwithstanding appellant's objections to this rule, other reasons to remove the microphone sampling sound tube include elimination of acoustic tube-based resonance noise; a reasons appellant apparently does not wish to challenge.

(D) The examiner improperly contends that evidence of copying is not valid without providing evidence that the competition conducted preliminary research.

Appellant alleges that no evidence of previous efforts by competitors is necessary to establish the efficacy of evidence of copying. The examiner was guided by MPEP § 716.06 which states that copying itself is not significant. *Cable Electric Products, Inc. v. Genmark, Inc.*, 770 F.2d 1015, 226 USPQ 881 (Fed. Cir. 1985). Not only that, but any alleged copiers may have been substantially copying Pluvinage.

(E) The examiner did not recognize that the weight of the secondary consideration evidence obviated the proposed prima facie cases of obviousness.

The Board is encouraged to review examiner's treatment of all of the expert's declarations in the Final Rejection of 25 June 2007 and the Non-Final Rejection of 18 December 2006, including those parts of the declaration referred to under this heading. The examiner does emphasize certain points germane to the excerpts presented in appellant's brief.

Commercial Success

The cleverness and revolutionary nature alleged by the experts for the inventions commercial success are attributable separately to *Pluvinage*, *Feeley* and *Fretz*. The experts felt that the appellant's invention performed well in the market before competing products were introduced, although the article Hearing aid sales slip back to norm, but leaders see growth potential, *The Hearing Journal* (December 2005) suggests that the appellant's held a mere 0.56% market share of all domestic hearing aid sales and 1.78% market share in domestic behind-the-ear sales in 2005—hardly an unequivocal success. The amount of advertising spent on Miracle Ear (is this even a hearing aid?) ads during the early 1990's neither speaks for the entire hearing aid market nor is it related to the market as it existed at the time appellant's invention entered the market as well as today's market. The experts allege that lots of advertising dollars are spent in the hearing aid industry, but Alan Dozier from GN ReSound is quoted in the Hearing Journal article as saying that not a lot of consumer advertising is done for hearing aids. The experts rebut this as an outdated statement, but it was apropos the close of 2005, the year of highest recorded earnings by the appellant. In close, the experts allege that the appellant's hearing aid cannot be compared in the market to any other hearing aids because of its revolutionary design. Essentially, the experts believe there is no substitute good for appellant's hearing aid. The market reflects whether or not substitute goods exist or not, and since none of the experts are economists and no factual evidence that appellant had no substitute, there is no reason to be convinced by this last allegation.

Copying

The examiner's main contention against copying is that the throng of pamphlets showing features similar to appellant's claimed invention are also showing features similar to the cited prior art. The experts allege that the mitigation of both the occlusion effect and insertion effect of appellant's invention (by minimization of the hearing aid receiver's size) is not attributable to the prior art. However, both *Pluvinage* and *Fretz* reject the closed, or substantially closed, mold design for an open ear design. The experts also directly address the rejection based on *Pluvinage* by stating that the appellant *rejects* the hybridized tube design of *Pluvinage*. The hybridized tube design of *Pluvinage* refers to the combination of an electrical wire running from a behind-the-ear unit to a receiver in the hearing aid wearer's ear canal and an acoustic tube for sampling sound in the ear canal and communicating the sampled sound to a microphone in the behind-the-ear unit. The examiner does not contest that the appellant does not disclose, teach or suggest using the acoustic tube of *Pluvinage*, but nothing in the appellant's disclosure implies *rejecting* the use of such a sound tube. The appellant might feel this is an unlawful disregard of expert testimony, however, the examiner contends that it is only reasonable to accord little to no weight to testimony that has no basis in reality.

Laudatory statements of competitors

The principal objections made by appellant here are based on accepting that the prior art copied the appellant's claimed invention and not the prior art.

Long felt need

The appellant erroneously infers long felt need from revolutionary status. Just because one might apprehend a use for a new device does not mean a need was ever felt to fulfill such a use.

(F) Pluvinage.

Appellant makes much ado about the disclosure of insertion gain in *Pluvinage*. In the Final Rejection, the examiner did not rely on the disclosure of insertion gain in *Pluvinage* to show anticipation of the claimed 3dB of insertion loss. Instead, the examiner relied upon inherent operation of the *Pluvinage* receiver that shares the same dimensions as the receiver claimed. Appellant also alleges that the limitation of generating 3dB of insertion loss is definite since insertion loss is defined by the size of the receiver in the ear. Because the hearing aid is turned off, the appellant alleges, no non-linear effects are measured. This position ignores the natural non-linear gain of the ear canal due to otoacoustic emissions. Moreover, the size of the receiver in the ear is determined by the ear canal, another variable not accounted for by appellant.

Appellant further alleges that *Pluvinage* required the microphone sampling tube that examiner established would have been obvious to remove. Appellant relies on expert testimony to establish the necessity, but the expert analysis lacks founding in the *Pluvinage* reference. For example, Dr. Berlin alleges that the tube was required to control feedback and make probe microphone measurements. Although these are conceivable uses of the microphone, the *Pluvinage* reference is utterly silent regarding these two functions. The only purpose of the tube, as disclosed by *Pluvinage*, is to enable filtering of sounds by the hearing aid wearer's pinnae,

which provide natural directional emphasis. Elimination of the tubes effectively eliminates the pinnae filters, but does not render the *Pluvinage* hearing aid totally inoperable or unfit for the purpose of providing an open ear hearing aid. *Pluvinage* at col. 1 ll. 13-50 ll. 57-64.

Appellant concludes that because *Pluvinage* requires the microphone sampling tube and because *Pluvinage* does not provide any specific motivation to remove the tube, no motivation exists to remove the sound sampling tube. However, *Pluvinage* does not require the sound sampling tube as just shown and the motivation to remove the tube comes from an established principle of law and knowledge available to one of ordinary skill in the art.

Appellant restates the argument from heading (C) *supra*, which is found unpersuasive for the same reasons.

Appellant errs in construing the examiner's position on removal of the microphone sampling tube as that removal of the tube would not make any real changes to *Pluvinage*. In contrast, examiner's position conceded that removal of the tube removes the tube's functions. Appellant further errs in relying on Dr. Berlin's allegation that the tube of *Pluvinage* was required by *Pluvinage*. Dr. Berlin reasons that the *Pluvinage* reference included a wide-dynamic range compressor. On this basis, Dr. Berlin concludes that the sound tube was necessary to connect the microphone to the processor to the receiver and to smooth/reduce feedback in the entire frequency response. Dr. Berlin's allegation is clearly flawed since it would require that all GN ReSound hearing aids from the early 90's using wide-dynamic range compression also use the sound tube only invented by GN ReSound in 1997. Also, the tube does not connect the microphone to the processor, as alleged, but rather the tube connects the hearing aid wearer's ear to the microphone. The appellant faced with at least the former proposition of error in Dr.

Berlin's testimony states that Dr. Berlin only meant that *Pluvinage* requires the servo-system. So, apparently, the processor disclosed by *Pluvinage* was not the ubiquitous processor of the early 90's. This back and forth by the appellant clearly undermines any authority that might have been given to Dr. Berlin regarding *Pluvinage*.

(G) Pluvinage in view of the Knowles product catalog.

Appellant alleges that the size of the Knowles receiver used by *Pluvinage* is not enough to establish apprehension of the size of the claimed receiver because the *Pluvinage* hearing aid occludes the ear with the sound sampling tube and also includes a "probable casing" about the Knowles receiver. In so alleging, appellant ignores examiner's elimination of the *Pluvinage* sound sampling tube and posits an element (the probable casing) not required by the claim. Ignoring the rejection of record and reconstructing the claim based on the improper incorporation of limitations from either the specification or sources such as knowledge of one of ordinary skill in the art render the allegations under this heading unpersuasive.

(H) Pluvinage in view of the Knowles product catalog and further in view of Miller.

The appellant's allegations under this heading are substantially similar to the allegations under heading (G) and are unpersuasive for the same reasons.

(I) Pluvinage in view of Mansgold.

The appellant makes no new allegations under this heading.

(J) Feeley in view of Fretz and further in view of Pluvinage.

This heading begins appellant's objections to the second prima facie case of obviousness based on *Feeley* in view of *Fretz*. Appellant first errors in his allegation that *Fretz*, seeking to eliminate the use of ear molds, invented the concept of routing a sound tube from a behind-the-ear hearing aid to the hearing aid wearer's ear canal. *Fretz*, did not, as appellant correctly notes, invent sound tube based behind-the-ear hearing aids. Instead, *Fretz*, like *Pluvinage*, forewent ear molds that substantially occluded a hearing aid wearer's ear canal in favor of an open fitting without molds. *Fretz* at ¶¶ 8-12. Appellant also alleges that *Feeley* requires a mold. Requirement is a sibling to inherency, and requires a reasoned statement of why the requirement for a mold flows from the teachings of *Feeley*. Appellant produced the testimony of experts, which again falls flat since they offer nothing more than an opinion that *Feeley* requires a mold.

(K) Feeley in view of Fretz and further in view of Pluvinage in view of GN Magazine, ReSound AiR pamphlet and the GN ReSound article.

Appellant alleges that the ReSound AiR pamphlet does not teach a sport lock extending from an electrical connector or receiver in a hearing aid wearer's ear canal. This is a piecemeal argument since combining the teachings of the pamphlet with *Fretz* results in extending a sport lock from the terminus of the electrical wire extending into the ear canal instead of the terminus of an acoustic tube extending into the ear canal. The other objections to combining the pamphlet's teachings with the prior art also rely on piecemeal analysis: the *Feeley* mold is obviated.

(L) Feeley in view of Fretz and further in view of Pluvinage in view of the Knowles product catalog and further in view of Miller.

No new objections are raised under this heading by appellant.

(M) Claims are not enabled.

The examiner does not, as the appellant alleges, simply conclude that the claimed receiver dimensions are not enabled because the examiner has not heard of any receivers smaller than the Knowles FK receiver. The examiner actually sandwiched-in-time appellant's invention between two references demonstrating the smallest known hearing aid receivers—both of which are substantially larger than the claimed receiver dimensions. In contrast to this finding of non-enablement, appellant simply suggests making receivers with a round cross section to overcome the difficulties highlighted by the examiner in the prior art. Appellant's friendly suggestion ignores the disclosure of the *Tsuda* round speaker, which was relied on to illustrate the unpredictability that results from over-aggressively shrinking transducer designs.

(N) Claims are indefinite.

Appellant makes much ado about insertion gain, but the examiner makes no reference to insertion gain in the outstanding 112, second rejections. To clarify the issues, the 112, second rejections have been clarified in this Answer. In review, the claims are indefinite since they refer to the generation of 3dB of loss but fail to provide enough detail to recreate the insertion loss measurements: stimulus parameters are not defined and the size of the ear canal used to measure insertion loss is not defined. The importance of knowing stimulus parameters is to account for

non-linear effects resulting from the non-linear amplification impedance of the ear canal arising from otoacoustic emissions. The importance of knowing the size of the ear canal is because insertion loss is a function of the size of the hearing aid receiver with respect to the size of the ear canal. The larger the portion of an ear canal occluded by a receiver, the greater the insertion loss. The claims are also indefinite since they define the size of the hearing aid receiver in terms of the size of a hearing aid wearer's ear canal, but ear canals vary from person to person, age group to age group and species to species. Appellant contends that this is not grounds for indefiniteness since there is a fairly defined range of ear canal dimensions. The examiner is unconvinced since appellant has failed to provide evidence of any fairly defined range and because the examiner recognizes that hearing aids might exist for disparate populations with different fairly defined ranges, including ranges that are not enabled (children, for example).

(O) Other evidence of secondary considerations.

The appellant closes his argument section by referring to the secondary considerations of non-obviousness that were treated in full in the Non-Final Rejection at 20-28 (18 December 2006). The Board is encouraged to review said Rejection for the examiner's treatment of the secondary considerations. The Board is also encouraged to review the Final Rejection at 18-27 (25 June 2007) to review the examiner's treatment of the declarations of Drs. Berlin and Glaser.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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